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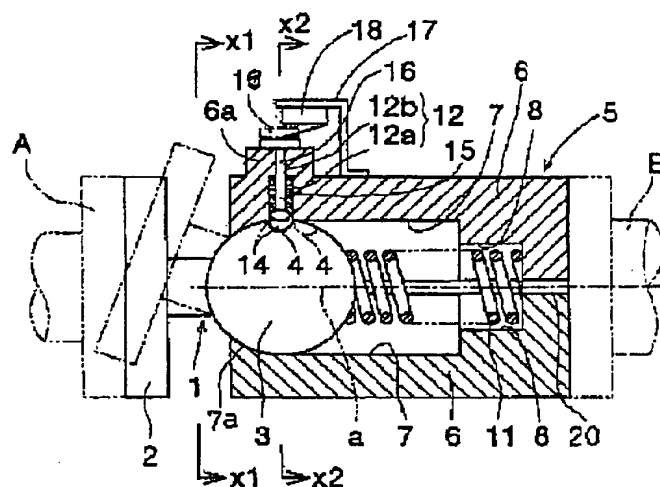
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TITLE : PROTECTOR OF ROBOT WRIST



ABSTRACT : PURPOSE: To compactificate a mechanism to protect a robot wrist from overloading.

CONSTITUTION: A bearing body 5 is formed by a pair of holders 6 being set up in each rotation symmetrical position of 180° with a center axis as the center and formed with each circular arced pinch-pressure surface on the opposed surfaces and it is clamped to a robot arm, and a spherical pivot 3 is formed in a wrist body being clamped to a robot hand A. The pivot 3 is held between both these holders 6 and in a state of being pressed frontward by dint of a spring 11, and these holders 6 are clamped together by a set bolt and then the pivot 3 is made in contact with both these pinch-pressure surfaces 7 as being capable of retracting and turning operations under pressure.

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(engl.Computerübersetzung)

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the protective device of the robot wrist for protecting the robot wrist of the connection section of the robot hand of an industrial robot, and a robot arm from an impact operation.

[0002]

[Description of the Prior Art] It faces conveying a work piece with an industrial robot, and if the work piece grasped at the robot hand collides with an obstruction, a work piece, a robot hand, a robot wrist, etc. will be damaged in response to an impact operation, or it will be damaged. For this reason, in the former, the overload which the reducer built into the robot receives was detected electrically; and when a robot's driving source was stopped by that detecting signal, or the differential pressure transfer clutch device in which a spring and pneumatic pressure were used was established and an overload was added to this differential pressure transfer clutch device, transfer of driving force was made into impossible.

[0003]

[Problem(s) to be Solved by the Invention] When there is a trouble that a time gap will arise by the time a driving source stops from the time of detecting, in detecting electrically the overload which joins a work piece etc., and damage by response delay advances, and it uses a differential pressure transfer clutch device, and the direction which transmits driving force is restricted and it is going to transmit driving force in the many directions, there is a trouble which equipment enlarges. The above-mentioned trouble is canceled, and the technical problem of this invention is compact and is offering the protective device of a robot wrist without response delay.

[0004]

[Means for Solving the Problem] Invention of claim 1 With one pair of holders installed in the symmetry-of-revolution location of 180 degrees centering on the medial axis which extended the axial center of a robot arm for the bearing object fixed to a robot arm by separating a gap The compression side which formed and curved in the shape of a circular face focusing on said medial axis to the opposed face of both this holder is formed, respectively. The close possible spherical pivot is formed in said compression side at the axis fixed to a robot hand. In the condition of having pressed to the front and having held to advance end position with the spring which put this pivot among said both holders, and was inserted in said bearing inside of the body It has the configuration which concluded said both holders with the set bolt, was made to make for the compulsory retreat actuation to said direction of a medial axis to said both compression side to be possible in said pivot, and possible the pressure welding of the compulsory rotation actuation to each direction which makes the core of said pivot the center of rotation, and connected said bearing object and said axis in the shape of a said alignment.

[0005] Invention of claim 2 cuts in said pivot the engagement hole which has a spherical-surface-like wall surface, and has the configuration which installed the detecting-element material which escapes from said engagement hole when it engages with said engagement hole when said pivot is held by the steady state at said bearing object, and said pivot retreated or rotates, and the pilot switch which outputs an overload detecting signal by motion of this detecting-element material.

[0006]

[Function] With the equipment of claim 1, if a robot hand and an axis receive an impact operation, while the pivot will resist frictional force with both the compression side, and the spring pressure of a spring and will retreat to a robot arm side, it rotates in the direction which

resisted frictional force with both the compression side, and received impulse force, and the impulse force applied to an axis from each is absorbed with an axis, both holders, and a spring.

[0007] With the equipment of claim 2, detecting-element material operates and a pilot switch outputs overload \*\*\*\*\* at the same time the pivot starts retreat or rotation according to an impact operation.

[0008]

[Effect of the Invention] If an axis receives an impact operation, while according to claim 1 the pivot will resist frictional force with both the compression side, and the spring pressure of a spring and will retreat, It can protect exactly, without spoiling the free nature in which the operation which controls a motion of the pivot and absorbs impulse force buffers effectively the impulse force applied to an axis from each by that of \*\*\*\*\*, and a robot hand has a robot wrist, even if it resists frictional force with both the compression side in the direction which received the impact operation, it rotates and carries out escape behavior to it to it and an axis receives an impact operation from which direction.

[0009] Moreover, since a robot wrist can be protected with an axis, and both holders and a spring, the device in which a robot wrist is protected can be simplified and miniaturized.

[0010] Since according to claim 2 detecting-element material operates and a pilot switch sends an overload detecting signal when the pivot starts retreat or rotation, the impulse force applied to an axis can be answered in an instant, the breakage and damage accompanying an overload can be prevented exactly, high-speed operation of a robot hand and a robot arm can be enabled, and productivity can be raised.

[0011]

[Example] Next, one example of this invention is explained according to a drawing. In the protective device of a robot wrist which protects the robot wrist used as the robot hand A of an industrial robot which conveys a work piece, and the connection section with the robot arm B to the impact operation at the time of a collision, The disc-like bond part 2 which a stop is \*\*\*\*\*ed and carried out to a robot hand, and is combined with it is formed in the front end section of the axis 1 fixed to a robot hand A, the spherical pivot 3 is formed in the back end section of an axis 1, and the engagement hole 4 which has a spherical-surface-like wall surface is cut in the illustration upper limit section of this pivot 3.

[0012] The bearing object 5 which a stop is \*\*\*\*\*ed and carried out to the robot arm B, and is fixed to it is formed by one pair of holders 6 and 6 installed in the symmetry-of-revolution location of 180 degrees centering on the medial axis a of the bearing object 5 which extended the axial center of the robot arm B by separating a gap 20 where the pivot 3 of an axis 1 is put in between.

[0013] In the opposed face of both the holders 6 of the bearing object 5, it has the configuration which curved in the shape of a circular face focusing on the medial axis a with the radius of the peripheral face of the pivot 3, and equal radius of curvature, and the compression side 7 in which the pivot 3 is closely possible is cut in a groove, respectively, the shape of the spherical surface which escapes from and carries out the stop of the pivot 3 to the front end section of both this pinching side 7 falls out, and stop side 7a is formed.

[0014] The spring insertion section 8 is cut near the back end section of the opposed face of both the holders 6, respectively.

[0015] one pair of pieces 9 of conclusion which projected to the method of both sides and were carried out protrude near the edges-on-both-sides front end of the peripheral face of both the holders 6, respectively, bolt insertion hole 9a is installed through the piece 9 of both conclusions of the holder 6 of an illustration top, respectively, it \*\*\*\*\*s to the piece 9 of both conclusions of the lower holder 6, and hole 9b is formed, respectively.

[0016] Both the holders 6 are concluded with one pair of set bolts 10 which adjust the contact pressure in which bolt insertion hole 9a is penetrated and \*\*\*\*\*ed, it is screwed in hole 9b, and

position with the spring 11 which put this pivot 3 among both the holders 6, and was inserted in the bearing object 5. Conclude both the holders 6 with the set bolt 10, make the compulsory retreat actuation to the direction of medial-axis a to both the compression side 7 is possible in the pivot 3, and possible the pressure welding of the compulsory rotation actuation to each direction which makes the core of the pivot 3 the center of rotation, and the bearing object 5 and said axis 1 are connected in the shape of a said alignment. The detecting-element material 14 which escapes from the engagement hole 4 when the engagement hole 4 which has a spherical-surface-like wall surface was cut in the pivot 3, it engages with the engagement hole 4 when the pivot 3 is held by the steady state at the bearing object 5, and the pivot 3 retreated or rotates, The pilot switch 18 which outputs an overload detecting signal by motion of this detecting-element material 14 is installed.

[0026] For this reason, it is while the pivot 3 will resist frictional force with both the compression side 7, and the spring pressure of a spring 11 and will retreat, if an axis 1 receives an impact operation, It can protect exactly, without spoiling the free nature in which the operation which controls a motion of the pivot 3 and absorbs impulse force buffers effectively the impulse force applied to an axis 1 from each by that of \*\*\*\*, and a robot hand has a robot wrist, even if it resists frictional force with both the compression side 7 in the direction which received the impact operation, it rotates and carries out escape behavior to it to it and an axis 1 receives an impact operation from which direction.

[0027] Moreover, since a robot wrist can be protected with an axis 1, and both the holders 6 and a spring 11, the device in which a robot wrist is protected can be simplified and miniaturized.

[0028] Furthermore, since the detecting-element material 14 operates and a pilot switch 18 sends an overload detecting signal when the pivot 3 starts retreat or rotation, the impulse force applied to an axis 1 can be answered in an instant, the breakage and damage accompanying an overload can be prevented exactly, high-speed movement of a robot hand A and the robot arm B can be enabled, and productivity can be raised.

## [Claim(s)]

[Claim 1] With one pair of holders installed in the symmetry-of-revolution location of 180 degrees centering on the medial axis which extended the axial center of a robot arm for the bearing object fixed to a robot arm by separating a gap The compression side which formed and curved in the shape of a circular face focusing on said medial axis to the opposed face of both this holder is formed, respectively. The close possible spherical pivot is formed in said compression side at the axis fixed to a robot hand. In the condition of having pressed to the front and having held to advance end position with the spring which put this pivot among said both holders, and was inserted in said bearing inside of the body Said both holders with a set bolt The protective device of the robot wrist characterized by having concluded, having made the compulsory retreat actuation to said direction of a medial axis to said both compression side being possible in said pivot, and possible the pressure welding of the compulsory rotation actuation to each direction which makes the core of said pivot the center of rotation, and connecting said bearing object and said axis in the shape of a said alignment.

[Claim 2] The protective device of the robot wrist according to claim 1 characterized by installing the detecting-element material which escapes from said engagement hole when the engagement hole which has a spherical-surface-like wall surface was cut in said pivot, it engages with said engagement hole when said pivot is held by the steady state at said bearing object, and said pivot retreated or rotates, and the pilot switch which outputs an overload detecting signal by motion of this detecting-element material.